

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (Previously Presented) A method implemented in a protocol manager for transmitting packets between a plurality of end user systems and one server, comprising:
 - in response to receiving an initial packet from an initiating end user system comprising one of the end user systems in a first connection protocol, communicating with the server using a second connection protocol to establish a network session and obtain a network session identifier to communicate with the server using the second connection protocol;
 - adding an entry to a data structure associating a port of a connection with the initiating end user system and the network session identifier for the server;
 - in response to receiving a data packet from the initiating end user system in the first connection protocol, processing the data structure to determine the network session identifier associated with the port of the connection to the initiating end user system on which the data packet was received; and
 - communicating the data packet from the initiating end user system to the server using the determined network session identifier and using the second connection protocol.
2. (Previously Presented) The method of claim 1, further comprising:
 - encapsulating the data packet from the initiating end user system with a header including the determined network session identifier, wherein the encapsulated data packet is transmitted to the server.
3. (Previously Presented) The method of claim 1, wherein the data packet comprises a first data packet, further comprising:
 - in response to receiving a second data packet from the server, determining the network session identifier included with the received second data packet;
 - determining from the data structure the connection to the initiating end user system associated with the determined network session identifier; and
 - transmitting the data packet on the determined connection to initiating end user system.

4. (Previously Presented) The method of claim 3, wherein the network session identifier is included within a header encapsulating the second data packet from the server, further comprising:

removing the header and the network session identifier from the second data packet, wherein the extracted second data packet is transmitted on the determined connection.

5. (Previously Presented) The method of claim 4, wherein the first data packet received from the initiating end user system is encapsulated in a Point-to-Point Protocol (PPP) packet and the connection with the initiating end user system comprises a standard telephone line and wherein the second data packet from the server is encapsulated in a PPP over Ethernet (PPPOE) packet having a header including the network session identifier of the PPPOE network session over which the PPPOE packet was transmitted.

6. (Previously Presented) The method of claim 1, wherein one network session identifier is obtained from the server for each connection to each of the end user systems.

7. (Previously Presented) The method of claim 1, wherein the server comprises an Internet Service Provider (ISP) server and wherein the end user systems communicate with the ISP server to access a network through the ISP server.

8. (Previously Presented) A method implemented in a protocol manager for transmitting packets between a plurality of end user systems and one server, comprising:

establishing a tunnel using a first connection protocol with the server having a session identifier for the server;

in response to receiving an initial packet from an initiating end user system comprising one of the end user systems in a second connection protocol, communicating authentication messages between the initiating end user system and the server to allow the initiating end user system to authenticate with the server;

assigning a network address to the end user system in response to the end user system authenticating with the server, wherein the server uses the network address to communicate with the initiating end user system assigned the network address via the protocol manager;

adding an entry to a data structure associating a connection with the initiating end user system and the network address assigned to the initiating end user system; and

communicating a data packet from the initiating end user system to the server using the first communication protocol and the session identifier established to communicate with the server.

9. (Previously Presented) The method of claim 8, further comprising:

encapsulating the data packet from the initiating end user system with a header including the determined network session identifier, wherein the encapsulated data packet is transmitted to the server.

10. (Previously Presented) The method of claim 8, wherein the data packet comprises a first data packet, further comprising:

in response to receiving a second data packet from the server, determining the network address included with the received second data packet;

determining from the data structure the connection to the initiating end user system associated with the determined network address;

transmitting the second data packet on the determined connection to the initiating end user system.

11. (Previously Presented) The method of claim 10, wherein the network session identifier is included within a header encapsulating the second data packet from the server, further comprising:

removing the header and the network session identifier from the second data packet, wherein the extracted second data packet is transmitted on the determined connection.

12. (Previously Presented) The method of claim 11, wherein the network address comprises an Internet Protocol (IP) address, wherein the first data packet received from the

initiating end user system is encapsulated in a Point-to-Point Protocol (Packet) and wherein the connection between the initiating end user system comprises a standard telephone line and wherein the second data packet from the server is encapsulated in a PPP over Ethernet (PPPOE) packet having a header including the network session identifier of the PPPOE network session over which the PPPOE packet was transmitted.

13. (Previously Presented) The method of claim 8, wherein the protocol manager performing the operations of assigning the network address, adding the entry to the data structure, determining one network session identifier and communicating the data packet is implemented in a system separate from the server and terminating on one end of the connections to the end user systems.

14. (Previously Presented) A system for transmitting packets between a plurality of end user systems and one server on a network, comprising:

- a processing unit;
- a plurality of connections capable of being used to connect with end user systems, wherein the plurality of connections are in data communication with the processing unit;
- an adaptor capable of communicating with the server over the network, wherein the adaptor is in data communication with the processing unit;
- program code that when executed by the processing unit causes the processing unit to perform:

- in response to receiving an initial packet from an initiating end user system comprising one of the end user systems in a first connection protocol, communicating with the server using a second connection protocol to establish a network session and obtain a network session identifier to communicate with the server using the second connection protocol;

- adding an entry to a data structure associating a port of a connection with the initiating end user system and the network session identifier for the server;

- in response to receiving a data packet from the initiating end user system in the second connection protocol, processing the data structure to determine the network

session identifier associated with the port of the connection to the initiating end user system on which the data packet was received; and
communicating the data packet from the initiating end user system to the server using the determined network session identifier and using the second connection protocol.

15. (Previously Presented) The system of claim 14, wherein the program code when executed causes the processing unit to further perform:

encapsulating the data packet from the initiating end user system with a header including the determined network session identifier, wherein the encapsulated data packet is transmitted to the server.

16. (Previously Presented) The system of claim 14, wherein the data packet comprises a first data packet, wherein the program code when executed causes the processing unit to further perform:

in response to receiving a second data packet from the server, determining the network session identifier included with the received second data packet;

determining from the data structure the connection to the initiating end user system associated with the determined network session identifier; and

transmitting the data packet on the determined connection to the end user system.

17. (Previously Presented) The system of claim 16, wherein the network session identifier is included within a header encapsulating the second data packet from the server, wherein the program code when executed causes the processing unit to further perform:

removing the header and network session identifier from the second data packet, wherein the extracted second data packet is transmitted on the determined connection.

18. (Previously Presented) The system of claim 17, wherein the first data packet received from the initiating end user system is encapsulated in a Point-to-Point Protocol (PPP) packet and the connection with the initiating end user system comprises a standard telephone line and wherein the second data packet from the server is encapsulated in a PPP over Ethernet

(PPPOE) packet having a header including the network session identifier of the PPPOE network session over which the PPPOE packet was transmitted.

19. (Previously Presented) The system of claim 14, wherein one network session identifier is obtained from the server for each connection to each of the end user systems.

20. (Previously Presented) The system of claim 14, wherein the server comprises an Internet Service Provider (ISP) server and wherein the end user systems communicate with the ISP server to access a network through the ISP server.

21. (Previously Presented) A system for transmitting packets between a plurality of end user systems and one server on a network, comprising:

- a processing unit;
- a plurality of connections capable of being used to connect with end user systems, wherein the plurality of connections are in data communication with the processing unit;
- an adaptor capable of communicating with the server over the network, wherein the adaptor is in data communication with the processing unit;
- program code that when executed by the processing unit causes the processing unit to perform:
 - establishing a tunnel using a first connection protocol with the server having a session identifier for the server;
 - in response to receiving an initial packet from an initiating end user system, comprising one of the end user systems in a second connection protocol, communicating authentication messages between the initiating end user system and the server to allow the initiating end user system to authenticate with the server;
 - assigning a network address to the end user system in response to the end user system authenticating with the server, wherein the server uses the network address to communicate with the initiating end user system assigned the network address via the protocol manager;
 - adding an entry to a data structure associating a connection with the initiating end user system and the network address assigned to the initiating end user system; and

communicating a data packet from the initiating end user system to the server using the first communication protocol and the session identifier established to communicate with the server.

22. (Previously Presented) The system of claim 21, wherein the program code when executed causes the processing unit to further perform:

encapsulating the data packet from the initiating end user system with a header including the determined network session identifier, wherein the encapsulated data packet is transmitted to the server.

23. (Previously Presented) The system of claim 21, wherein the data packet comprises a first data packet, wherein the program code when executed causes the processing unit to further perform:

in response to receiving a second data packet from the server, determining the network address included with the received second data packet;

determining from the data structure the connection to the initiating end user system associated with the determined network address;

transmitting the second data packet on the determined connection to the initiating end user system.

24. (Previously Presented) The system of claim 23, wherein the network session identifier is included within a header encapsulating the second data packet from the server, wherein the program code when executed causes the processing unit to further perform:

removing the header and the network session identifier from the second data packet, wherein the extracted second data packet is transmitted on the determined connection.

25. (Previously Presented) The system of claim 24, wherein the network address comprises an Internet Protocol (IP) address, wherein the first data packet received from the initiating end user system is encapsulated in a Point-to-Point Protocol (Packet) and wherein the connection between the initiating end user system comprises a standard telephone line and wherein the second data packet from the server is encapsulated in a PPP over Ethernet (PPPOE)

packet having a header including the network session identifier of the PPPOE network session over which the PPPOE packet was transmitted.

26. (Previously Presented) An article of manufacture comprising at least one of hardware having hardware logic and a computer readable storage medium having code execute for transmitting packets between a plurality of end user systems and one server, wherein the article of manufacture causes operations to be performed, the operations comprising:

in response to receiving an initial packet from an initiating end user system comprising one of the end user systems in a first connection protocol, communicating with the server using a second connection protocol to establish a network session and obtain a network session identifier to communicate with the server using the second connection protocol;

adding an entry to a data structure associating a port of a connection with the initiating end user system and the network session identifier for the server;

in response to receiving a data packet from the initiating end user system, processing the data structure to determine the network session identifier associated with the port of the connection to the initiating end user system on which the data packet was received; and

communicating the data packet from the initiating end user system to the server using the determined network session identifier and using the second connection protocol.

27. (Previously Presented) The article of manufacture of claim 26, wherein the operations further comprise:

encapsulating the data packet from the initiating end user system with a header including the determined network session identifier, wherein the encapsulated data packet is transmitted to the server.

28. (Previously Presented) The article of manufacture of claim 26, wherein the data packet comprises a first data packet, wherein the operations further comprise:

in response to receiving a second data packet from the server, determining the network session identifier included with the received second data packet;

determining from the data structure the connection to the initiating end user system associated with the determined network session identifier; and

transmitting the data packet on the determined connection to the initiating end user system.

29. (Previously Presented) The article of manufacture of claim 28,, wherein the network session identifier is included within a header encapsulating the second data packet from the server, further comprising:

removing the header and network session identifier from the second data packet, wherein the extracted second data packet is transmitted on the determined connection.

30. (Previously Presented) The article of manufacture of claim 29, wherein the data packet received from the initiating end user system is encapsulated in a Point-to-Point Protocol (PPP) packet and the connection with the initiating end user system comprises a standard telephone line and wherein the second data packet from the server is encapsulated in a PPP over Ethernet (PPPOE) packet having a header including the network session identifier of the PPPOE network session over which the PPPOE packet was transmitted.

31. (Previously Presented) The article of manufacture of claim 26, wherein one network session identifier is obtained from the server for each connection to each of the end user systems.

32. (Previously Presented) The article of manufacture of claim 26, wherein the server comprises an Internet Service Provider (ISP) server and wherein the end user systems communicate with the ISP server to access a network through the ISP server.

33. (Previously Presented) An article of manufacture comprising at least one of hardware having hardware logic and a computer readable storage medium having code execute for transmitting packets between a plurality of end user systems and one server, wherein the article of manufacture causes operations to be performed, the operations comprising:

establishing a tunnel using a first connection protocol with the server having a session identifier for the server;

in response to receiving an initial packet from an initiating end user system, comprising one of the end user systems in a second connection protocol, communicating authentication messages between the initiating end user system and the server to allow the initiating end user system to authenticate with the server;

assigning a network address to the end user system in response to the end user system authenticating with the server, wherein the server uses the network address to communicate with the initiating end user system assigned the network address via the protocol manager;

adding an entry to a data structure associating a connection with the initiating end user system and the network address assigned to the initiating end user system; and

communicating a data packet from the initiating end user system to the server using the first communication protocol and the session identifier established to communicate with the server.

34. (Previously Presented) The article of manufacture of claim 33, wherein the operations further comprise:

encapsulating the data packet from the initiating end user system with a header including the determined network session identifier, wherein the encapsulated data packet is transmitted to the server.

35. (Previously Presented) The article of manufacture of claim 33, wherein the data packet comprises a first data packet, wherein the operations further comprise:

in response to receiving a second data packet from the server, determining the network address included with the received second data packet;

determining from the data structure the connection to the initiating end user system associated with the determined network address;

transmitting the second data packet on the determined connection to the initiating end user system.

36. (Previously Presented) The article of manufacture of claim 35, wherein the network session identifier is included within a header encapsulating the second data packet from the server, further comprising:

removing the header and the network session identifier from the second data packet, wherein the extracted second data packet is transmitted on the determined connection.

37. (Previously Presented) The article of manufacture of claim 36, wherein the network address comprises an Internet Protocol (IP) address, wherein the first data packet received from the initiating end user system is encapsulated in a Point-to-Point Protocol (Packet) and wherein the connection between the initiating end user system comprises a standard telephone line and wherein the second data packet from the server is encapsulated in a PPP over Ethernet (PPPOE) packet having a header including the network session identifier of the PPPOE network session over which the PPPOE packet was transmitted.

38. (Original) The article of manufacture of claim 33, wherein the operations of assigning the network address, adding the entry to the data structure, determining one network session identifier and communicating the data packet are performed in a system separate from the server and terminating on one end of the connections to the end user systems